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Description

The present invention relates to a softener. Particularly, it relates to a concentrated softener for clothes which can impart excellent softness and antistatic properties to various fibers and is reduced in viscosity 5 increase with time.

[Prior Art]

Clothes tend to be stiffened and exhibit uncomfortable hand as they are repeatedly worn and washed, 10 because the treatment applied to the fiber is washed out and the fiber itself is degraded. Recently, therefore, a softener which can impart softness and antistatic properties to fibers is frequently used in many homes.

Most of commercially available household softeners contain a cationic surfactant having one or two long-chain alkyl groups in its molecule, particularly di(harden tallow alkyl)dimethylammonium salt as a 15 main component.

A softener base comprising such a quaternary ammonium salt as a main component is only slightly soluble in water, so that it is generally used as a softener in the form of a 3 to 5% by weight aqueous dispersion or emulsion. As the clothes to be treated with a softener have increased, a concentrated softener for clothes comprising a high-concentration aqueous dispersion has been strongly demanded in order to 20 reduce the distribution and packaging costs and the storage space of stock in home or shop.

However, an aqueous dispersion softener as described above exhibits a remarkably increased viscosity, thus causing various troubles in handling, when the concentration thereof exceeds 5% by weight.

The known processes according to the prior art for preparing a high-concentration softener include:

- 1) a process of adding a water-soluble cationic surfactant,
- 2) a process of adding an adduct of a higher alcohol or an alkylphenol with ethylene oxide,
- 3) a process of adding urea or ethylene glycol, and
- 4) a process of adding a water-soluble salt.

However, the processes 1) to 3) are problematic in that the degree of concentration is insufficient and that the obtained softener causes viscosity increase with time, thus being not effective sufficiently.

According to the process 4), the viscosity increase of the softener with time can be hardly controlled, though the initial viscosity thereof is perceptibly lowered. Further, the softener tends to cause phase separation when it contains a large amount of a salt. Thus, no satisfactory concentrated softener for clothes has been obtained as yet.

EP-A-0043622, US-A-4179382 and EP-A-0095580 disclose liquid softening compositions comprising 35 polyether derivatives or cationic polymers and quaternary ammonium compounds.

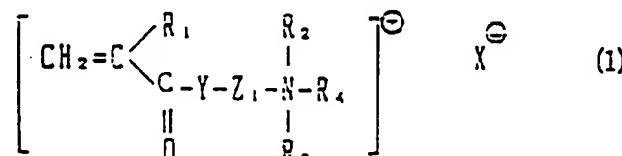
Under these circumstances, the inventors of the present invention have eagerly studied with the purpose of overcoming the above problems and have found that a high-concentration dispersion of a quaternary ammonium salt which is improved in initial characteristics and can remarkably control viscosity increase with time can be prepared by dispersing said quaternary ammonium salt in the presence of a 40 specified polyoxyalkylene adduct or a polymer of a cationic surfactant monomer.

According to this invention we provide a cloth-softening liquid composition which comprises 7 to 30 wt.% of (a) a quaternary ammonium and 0.2 to 10 wt.% of (b-I) a polyether or a derivative thereof or (b-II) a polymer or copolymer of a cationic surfactant monomer(s) and the balance of water,

said polyether (b-I) having a molecular weight of 5,000 to 200,000 being either an ethylene oxide or an 45 ethylene oxide and propylene oxide adduct to a compound having at least five active hydrogen atoms, the oxyethylene units comprising at least 80% by weight of the total molecular weight of polyether units,

said cationic surfactant monomer (b-II) being represented by the following formula (1):

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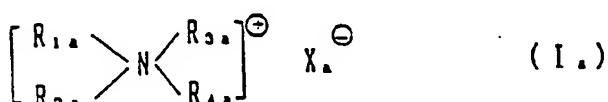
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wherein R_1 stands for a hydrogen atom or a methyl group; R_2 stands for a straight-chain or branched alkyl or alkenyl group having 8 to 24 carbon atoms or a substituted, straight-chain or branched alkyl or alkenyl group having 8 to 24 carbon atoms; R_3 and R_4 each stands for a hydrogen atom or a lower alkyl; C_{2-4} hydroxyalkyl or polyoxoalkylene ($P=1$ to 3) group; Y stands for an oxygen atom or an $-NH-$ group; Z_1 is a hydroxyalkylene group having 2 to 4 carbon atoms and X stands for a halogen atom or an acid residue.

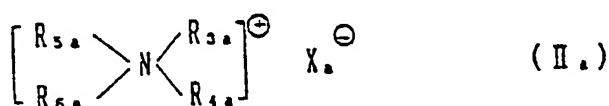
5 The invention will be below illustrated in reference to the components (a) and (b-l).

The quaternary ammonium salt (a) to be used as a softener base in the present invention may include the following salts, which may be used as a mixture of two or more of them:

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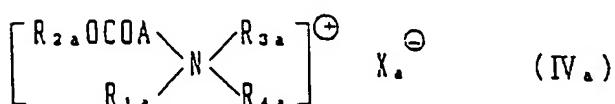


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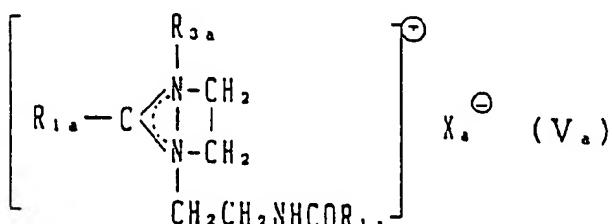


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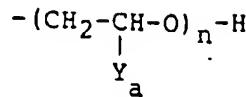
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wherein

R_{1a} : a C_{8-22} saturated or unsaturated, straight-chain or branched alkyl or hydroxyalkyl group,

R_{2a} : a C_{8-24} saturated or unsaturated, straight-chain or branched alkyl or hydroxyalkyl group,

55 R_{3a} , R_{4a} , R_{6a} : each a C_{1-3} alkyl or hydroxyalkyl group or a group of



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wherein n is 1 to 10 and Y_a is a hydrogen atom or a methyl group,

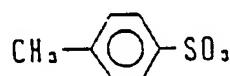
R_{5a} : a C_{24-38} saturated or unsaturated branched alkyl or hydroxyalkyl group,

$\text{R}_{7a}, \text{R}_{8a}$: each a C_{7-21} saturated or unsaturated, straight-chain or branched alkyl or hydroxyalkyl group,

10 A, B : each a C_{1-3} alkylene group, and

X_a : a CH_3SO_4 , $\text{C}_2\text{H}_5\text{SO}_4$, $\text{C}_n\text{H}_{2n+1}\text{COO}$ (wherein n is 0 to 17), $\text{C}_n\text{H}_{2n+1}\text{OPO}_3$ (wherein n is 8 to 18), HOCH_2COO , or

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20 group or a halogen atom.

The compound having at least five active hydrogen atoms which is a starting material for the preparation of the polyoxyalkylene adduct to be used in the present invention as the component (b-I) includes polyhydric alcohols such as sorbitol, sucrose, polyglycerin, polyvinyl alcohol and partially saponified polyvinyl acetate; polyhydric phenols such as phenol resins and alkylphenol-formalin condensates; 25 polyamines such as diethylenetriamine, triethylenetetramine, tetraethylenepentamine, pentaethylenehexamine and polyethyleneimine. Further, partial amide derivatives and N-alkyl-substituted derivatives of these polyamines can be used, as far as they have at least five residual active hydrogen atoms.

The polyether which is a specified polyoxyalkylene adduct as defined above can be easily prepared by carrying out the addition of a compound having at least five active hydrogen atoms with an alkylene oxide 30 component containing ethylene oxide as an essential component according to any conventional method. Among the polyethers thus prepared, adducts thereof containing ethylene oxide homopolymer segment and adducts thereof containing ethylene oxide/propylene oxide block or partially block copolymer segment are particularly preferred. Although the addition of any of the two oxides may be first carried out, a more excellent concentrated softener for clothes can be obtained by carrying out the addition of propylene 35 oxide (hereinafter abbreviated to "PO") and that of ethylene oxide (hereinafter abbreviated to "EO") successively.

The molecular weight of the polyether or derivative thereof is 5,000 to 200,000, preferably 10,000 to 100,000. Further, the total weight of the EO chain segment is at least 80% of the total molecular weight.

The polyether derivatives according to the present invention include sulfates, phosphates, alkylcarboxylates and fatty acid esters of the terminal hydroxyl group of the polyether and cations obtained by partially 40 cationizing the nitrogen atom of the polyether, among which fatty acid esters and cations are particularly preferred.

In the preparation of the above fatty acid ester of the polyether, it is preferred to use a fatty acid having 7 to 23 carbon atoms, though the number of double bonds and the present of branching have not significant 45 influence upon the performance.

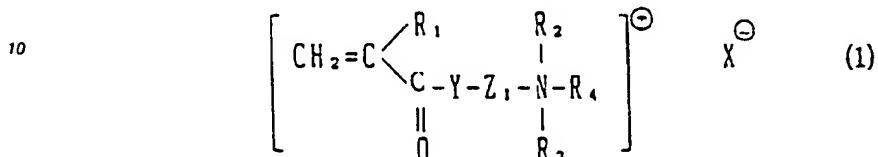
The above cations include those obtained by cationizing the polyether with dialkylsulfates or alkyl halides and those obtained by neutralizing the polyether with acetic acid or an alkylbenzenesulfonic acid.

In the concentrated softener according to the present invention, it is presumed that the quaternary ammonium salt particles present in water may be sterically protected by the component (b-I) owing to its 50 remarkably high bulkiness and high molecular weight, so that the aggregation of the particles may be inhibited to thereby control the viscosity increase.

The polymer (b-II) comprising a cationic surfactant monomer as an essential component to be used in the present invention can be prepared by any conventional method. For example, it can be obtained by polymerizing a mixture comprising a cationic surfactant monomer and other vinyl monomer(s) in a solvent 55 in the presence of a radical polymerization initiator. Preferred examples of the solvent include water; alcohols such as ethanol, isopropanol and butanol; polyols such as ethylene glycol and propylene glycol; and ketones such as methyl ethyl ketone. The radical polymerization initiator is preferably selected from among those soluble in the solvent used. For example, when water or a water-containing organic solvent is

used, the initiator is selected from among ammonium persulfate, potassium persulfate, 2,2'-azobis(2-amidinopropane) dihydrochloride, 4,4'-azobis(4-cyanovaleic acid) and the like. The polymerization temperature is generally set at the decomposition point of the radical polymerization initiator used, though it may be set at a lower temperature, when a redox initiator is used.

5 The cationic surfactant monomers to be used in the present invention are represented by the following formula:



wherein R_1 stands for a hydrogen atom or a methyl group; R_2 stands for a straight-chain or branched alkyl or alkenyl group having 8 to 24 carbon atoms or a substituted, straight-chain or branched alkyl or alkenyl group having 8 to 24 carbon atoms; R_3 and R_4 each stand for a hydrogen atom or a lower alkyl, 20 C_{2-4} hydroxyalkyl or polyoxalkylene ($\bar{P}=1$ to 3) group; Y stands for an oxygen atom or an $-\text{NH}-$ group; Z_1 is a hydroxyalkylene group having 2 to 4 carbon atoms and X stands for a halogen atom or an acid residue.

The polymer (b-II) is preferably a binary or higher copolymer comprising a cationic surfactant monomer as described above and vinyl monomer(s). The copolymer preferably contains 3 to 50 % by weight, still preferably 5 to 30 % by weight of such a cationic surfactant monomer.

25 The vinyl monomer to be copolymerized is not particularly limited and includes the following monomers:

- hydrophobic monomer
 - alkyl (meth)acrylates having a C_{1-24} hydrocarbyl group and styrene and α -methylstyrene which may be substituted on the benzene ring,

30 • hydrophilic monomer

- acrylamide, methacrylamide, N-vinyl-2-pyrrolidone, 2-hydroxyethyl methacrylate, 2-hydroxyethyl acrylate, polyethylene glycol monomethacrylate, methoxypolyethylene glycol methacrylate and acetone acrylamide.

In the softener according to the present invention, its viscosity increase is controlled presumably because the long-chain alkyl or alkenyl group of the cationic surfactant monomer constituting the polymer (b-II) strongly adsorb the softening component to give an electric charge, while the polymer (b-II) having a high molecular weight, as a whole, sterically protect the quaternary ammonium salt in water, thus inhibiting the aggregation of the particles.

According to the present invention, the content of the component (a) in the concentrated softener is 7 to 40 30 % by weight, preferably 10 to 20 % by weight, while the content of the component (b) therein is 0.2 to 10 % by weight, preferably 0.5 to 5 % by weight.

If the content of the component (a) is less than 7 % by weight, the advantage due to the concentration will hardly be obtained as compared with the softener of an ordinary concentration according to the prior art, while if the content exceeds 30 % by weight, the resulting softener will have such a high viscosity as to 45 cause various troubles in handling.

If the content of the component (b) is less than 0.2 % by weight, the resulting softener will exhibit too high an initial viscosity and the viscosity increase thereof with time cannot be controlled sufficiently. On the contrary, the use thereof in such an amount as to give a content exceeding 10 % by weight will be economically disadvantageous.

50 The concentrated softener for clothes according to the present invention may contain a perfume, dyestuff, nonionic surfactant, silicone and/or antimicrobial agent, which are ordinarily used in a softener for clothes, or a solvent such as isopropyl alcohol, ethylene glycol or propylene glycol or a water-soluble salt such as common salt, ammonium chloride or calcium chloride.

Although the compounding procedure of the components (a) and (b) and other components is not 55 particularly limited, the compounding thereof is generally carried out by throwing the component (a) into an aqueous solution or dispersion containing a predetermined amount of the component (b) at a temperature selected in the range of room temperature to 70 °C depending upon the softening point of the component (a) used, followed by stirring. Other components such as nonionic surfactant or salt may be added either

together with the component (b) or after the compounding of the components (a) and (b). The compounding procedure which is most effective in lowering the initial viscosity of the concentrated softener is a process comprising adding the component (b) and other components such as salt to a concentrated aqueous dispersion of the component (a), while the compounding procedure which is simplest in terms of equipment 5 is a process which comprises preliminarily mixing the components (a) and (b) and part of other components and dispersing the obtained mixture in water.

In any of these procedures, the compounding may be carried out with a mixer fitted with blades or a line mixer or by high-pressure injection. Particularly, when the compounding is carried out first with a kneader or a mixer fitted with blades and then with a high-shear mixer, excellent dispersion can be attained.

10 The concentrated softener for clothes according to the present invention which contains the components (a) and (b) as active ingredients exhibits its effect in an amount which is nearly inversely proportional to the active ingredients as compared with a softener of a conventional concentration. Therefore, the concentrated softener for clothes brings about great saving of energy and resources in various steps including transportation, packaging and storage of stock.

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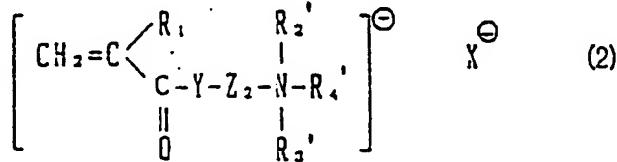
[Examples]

The present invention will be described in more detail by referring to the following Examples, though it is not limited to them.

20 The components (a) to use in Examples are listed in Table 1 with reference to the above shown formulae; the components (b-I), in Table 2; and the components (b-II), in Table 3.

In Table 3 general formula (2) is the following:

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wherein R_1 stands for a hydrogen atom or a methyl group; R_2' , R_3' and R_4' each stands for hydrogen atom, a lower alkyl, C_{2-4} hydroxyalkyl or polyoxyalkylene ($\bar{P}=1$ to 3) group; Y stands for an oxygen atom or 35 an $-\text{NH}-$ group; Z_2 stands for an alkylene or hydroxyalkylene group having 2 to 4 carbon atoms and X stands for a halogen atom or an acid residue.

One example of the compound (b-II) is shown below.

150 parts of a solution of 5.4 parts of 2-hydroxy-3-methacryloyloxypropyldimethylstearylammmonium chloride (corresponding to a compound of the formula (1) wherein R_1 is a methyl group; R_2 is a stearyl group; R_3 and R_4 are each a methyl group; Y is an oxygen atom; Z is 2-hydroxypropylene group and X is a halogen atom), 37 parts of β -methacryloyloxyethylidemethylstearylammmonium ethosulfate, 12.5 parts of styrene, 10.3 parts of acrylamide and 1.0 part of 2,2'-azobisisobutyronitrile in isopropanol was dropwise added to 100 parts of isopropanol under reflux over a period of 2 hours. After the completion of the dropwise addition, the reaction mixture was heated under reflux for 3 hours and diluted with 200 ml of water. The 45 resulting mixture was distilled to remove the isopropanol and subjected to concentration adjustment to obtain an aqueous solution having a solid content of 20.0 %.

The compositions obtained in Examples and Comparative Examples are examined in the below shown manners.

50 1) Physical properties and stability

The concentrated softener for clothes was stored at a temperature of -10°C , room temperature or 50°C for 20 days to evaluate its appearance and fluidity. Results are shown in Tables 4 and 5. All of the concentrated softeners according to the present invention were excellent in these respects and caused little 55 changes with time.

2) Softening power

Commercially available cotton towel and knit underwear, acrylic fiber, polyester fiber and blended fiber were bashed five times with a commercially available detergent (Zab mfd. by Kao Corporation; registered 5 trade mark) and got rid of the detergent adhering thereto. They were treated with a 0.1 % by weight aqueous solution (in terms of active ingredients, 3.5° DH hard water) of the concentrated softener according to the present invention at 25°C with a bath ratio of 1/30 under stirring for one minute, air-dried in a room and allowed to stand in a thermo-hygrotated room of 25°C and 65 % RH for 24 hours. The 10 resulting clothes were compared with those treated with a softener of a conventional concentration. The concentrated softeners of the present invention were confirmed to have a sufficiently high softening power.

Test on the composition of (a) and (b-I)

Examples 1 to 39 and Comparative Examples 1 to 8 are listed in Table 4 together with their test results.

Test on the composition of (a) and (b-II)

Examples 40 to 64 and Comparative Examples 9 to 16 are listed in Table 5 together with their test results.

20 The below shown notes are added to Table 4 and Table 5.

- 1) % by weight
- 2) cps, the mark "x" means failure in measurement
- 3) polyoxyethylene (15 mol) lauryl ether
- 4) ethylene glycol

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Table 1 Composition of component (a)

Symbol	Formula	Structure
a-1	I _a	$R_{1a}=R_{2a}=C_{18}$ alkyl, $R_{3a}=R_{4a}=$ methyl, $X_a=C1$
a-2	I _a	$R_{1a}=R_{2a}=C_{18}$ alkyl, $R_{3a}=$ methyl, $R_{4a}=C_{2H_5}$, $X_a=C_{2H_5SO_4}$
a-3	I _a	$R_{1a}=C_{12}$ alkyl, $R_{2a}=C_{18}$ alkyl, $R_{3a}=R_{4a}=$ methyl, $X_a=C1$
a-4	II _a	$R_{5a}=C_{28}$ branched alkyl, $R_{3a}=R_{4a}=R_{6a}=$ methyl, $X_a=C1$
a-5	III _a	$R_{7a}=R_{8a}=C_{17}$ alkyl, $R_{3a}=C_{2H_5OH}$, $R_{4a}=C_{2H_5}$, $A=B=C_{12}CH_2$, $X_a=C_{2H_5SO_4}$
a-6	IV _a	$R_{1a}=C_{10}$ alkyl, $R_{2a}=C_{18}$ alkyl, $R_{3a}=R_{4a}=$ methyl, $X_a=Br$, $A=CH_2$
a-7	V _a	$R_{1a}=C_{17}$ unsaturated alkyl, $R_{3a}=C_{2H_5}$, $X_a=C_{2H_5SO_4}$
a-8	VI _a	$R_{1a}=C_{10}$ alkyl, $R_{2a}=C_{18}$ alkyl, $R_{3a}=R_{4a}=$ methyl, $A=CH_2CH_2$, $X_2=C1$

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Table 2 Component (b-1)

Symbol	Starting material	(number of active hydrogen atoms)	Alkylenic oxide ¹ (ratio)2)	MW	Modification
b-1	glycerin	(3)	PO/EO (1/9)	9,500	---
b-2	ethylenediamine	(6)	PO/EO (3/7)	16,000	---
b-3	diethanolamine	(3)	PO/EO (1/9)	8,800	---
b-4	sorbitol	(6)	PO/EO (2/8)	12,000	---
b-5	sorbitol	(6)	EO	14,000	---
b-6	phenol resin (10-nuclear)	(10)	EO	20,000	---
b-7	triethylenetetramine	(6)	PO/EO (2/8)	13,000	oleic acid-modified (1/6)3)
b-8	"	(6)	PO/EO (2/8)	13,000	diethylsulfate (3/6)4)
b-9	"	(6)	PO/EO (2/8)	13,000	
b-10	tetraethylenepentamine	(7)	PO/EO (2/8)	16,000	
b-11	"	(7)	EO	15,000	
b-12	polyethyleneimine (MW1600)	(38)	PO/EO (2/8)	70,000	
b-13	"	(38)	EO	100,000	
b-14	oleic amide of tetraethylene-pentamine	(6)	EO	8,000	

1) PO: propylene oxide, EO: ethylene oxide 2) weight ratio

3) degree of esterification based on the terminal hydroxyl group

4) degree of cationization per nitrogen atom

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Table 3 Composition of component (b-III)

Symbol	Cationic surfactant monomer general formula (1)	Hydrophobic monomer	Hydrophilic monomer	Cationic monomer general formula (2)		
				R ₁ =methyl	R ₂ =stearyl	R ₃ , R ₄ =methyl
b-1	R ₁ =methyl R ₂ =stearyl R ₃ , R ₄ =methyl Y=oxygen Z ₁ =2-hydroxypropylene X=Cl	5.4 parts	styrene parts	12.5 parts	acrylamide parts	10.3 parts
					R ₅ =ethyl	37 parts
					Y=oxygen	
					Z ₂ =ethylene	
					X=OSO ₃ C ₂ H ₅	
b-2	R ₁ =methyl R ₂ =stearyl R ₃ , R ₄ =methyl Y=oxygen Z ₁ =2-hydroxypropylene X=Cl	8.0 parts	2-ethylhexyl acrylate parts	10.5 parts	acrylamide parts	10.5 parts
					R ₅ =ethyl	37 parts
					Y=oxygen	
					Z ₂ =2-hydroxypropylene	
					X=OSO ₃ C ₂ H ₅	
b-3	R ₁ =methyl R ₂ =lauryl R ₃ , R ₄ =methyl Y=oxygen Z ₁ =2-hydroxypropylene X=Cl	15.0 parts	2-ethylhexyl acrylate parts	10.5 parts	polyethylene glycol monomethacrylate parts	10.5 parts

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(continued)

Symbol	Cationic surfactant monomer General formula (1)	Hydrophobic monomer	Hydrophilic monomer	Cationic monomer General formula (2)
b-4	R ₁ =hydrogen R ₂ =stearyl R ₃ , R ₄ =methyl Y=oxygen Z ₁ =2-hydroxypropylene X=Cl	8.0 parts	styrene 10.5 parts	2-hydroxyethyl methacrylate 10.5 parts
b-5	R ₁ =methyl R ₂ =stearyl R ₃ , R ₄ =methyl Y=oxygen Z ₁ =2-hydroxypropylene X=Cl	24.5 parts	styrene 2.5 parts	acrylamide 10.5 parts
b-6			styrene 12.5 parts	acrylamide 10.3 parts
b-7			styrene 15.5 parts	acrylamide 15.3 parts

Examples b-6 and b-7 are comparative examples.

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Table 4

No.	Composition of the softener					Initial state and stability after 20 days				
	component (a)		component (b-1)		other component (1)	other component (2)		initial properties		stability after 20 days
	compound	1) amt.	polymer	1) amt.	compound	1) amt.	other compound	amt.	viscosity 2) amt.	appearance
1	a-1	12	b-1	3	CaCl ₂	0.2			x	Gelling
2	a-1	12	b-1	5	CaCl ₂	0.5			x	Gelling
3	a-1	15	b-1	5	CaCl ₂	0.1	c-2 c-1 c-1 c-1	4	340	Good
4	a-1	15	b-1	5	CaCl ₂	0.2	c-1 c-1 c-1	1	x	Gelling
5	a-1	15	b-2	5	CaCl ₂	0.2			580	Good
6	a-3	15	b-2	5	CaCl ₂	0.2			x	Gelling
7	a-5	12	b-3	3	CaCl ₂	0.2			x	Gelling
8	a-5	15	b-3	5	CaCl ₂	0.2			x	Gelling
Comp. Examples	1	a-1	b-4	1	CaCl ₂	0.2			260	Good
	2	a-1	b-4	3	CaCl ₂	0.2			450	Good
	3	a-1	b-4	5	CaCl ₂	0.1	c-2 c-1 c-1	4	160	Good
	4	a-1	b-4	3	CaCl ₂	0.2	c-1 c-1	3	240	Good
	5	a-1	b-4	3	CaCl ₂	0.2	c-1 c-1	3	130	Good
	6	a-1	b-4	3	NaCl	0.2			140	Good
	7	a-1	b-5	3	CaCl ₂	0.2			240	Good
	8	a-1	b-5	3	CaCl ₂	0.2			180	Good
	9	a-1	b-6	3	CaCl ₂	0.1			260	Good
	10	a-1	b-7	3	CaCl ₂	0.2			340	Good
	11	a-1	b-8	3	CaCl ₂	0.2			130	Good
	12	a-1	b-9	3	CaCl ₂	0.2			280	Good
	13	a-1	b-10	3	CaCl ₂	0.2			380	Good
	14	a-1	b-10	3	NaCl	0.2			140	Good
	15	a-1	b-10	3	CaCl ₂	0.2			180	Good
	16	a-1	b-11	3	CaCl ₂	0.1			160	Good
	17	a-1	b-12	3					240	Good
	18	a-1	b-13	3					230	Good
	19	a-1	b-14	3	CaCl ₂	0.2			150	Good

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(continued)

No.	Composition of the softener				Initial state and stability after 20 days			
	component (a)		component (b-1)		other component (1)		initial properties	
	compound 1)	amt.	polymer 1)	amt.	compound 1)	amt.	viscosity 2)	appearance
20	a-2	15	b-4	3			380	good
21	a-2	15	b-5	3	NaCl	0.2	440	good
22	a-2	15	b-5	3			140	good
23	a-2	15	b-10	3	CaCl ₂	0.2	240	good
24	a-2	15	b-10	3	CaCl ₂	0.1	180	good
25	a-3	15	b-6	3	CaCl ₂	0.1	260	good
26	a-2	15	b-10	3	CaCl ₂	0.2	350	good
27	a-2	15	b-10	3	CaCl ₂	0.2	180	good
28	a-3	15	b-4	3	CaCl ₂	0.2	170	good
29	a-3	15	b-10	3	CaCl ₂	0.2	260	good
30	a-3	15	b-10	3	NaCl	0.2	140	good
31	a-3	15	b-10	3			180	good
32	a-4	15	b-4	3	CaCl ₂	0.1	160	good
33	a-4	15	b-10	3			240	good
34	a-4	15	b-13	3			230	good
35	a-5	15	b-4	3			190	good
36	a-5	15	b-4	3			140	good
37	a-6	15	b-10	3	CaCl ₂	0.2	230	good
38	a-6	15	b-10	3	CaCl ₂	0.2	150	good
39	a-7	15	b-4	3			380	good
Examples								
							room temp.	50°C

Table 5

R.O.	Composition of the softener						Initial state and stability			
	component (a)		component (b-III)		other component (1)		other component (2)		after 20 days	
	compound	amt. 1)	compound	amt. 1)	compound	amt. 1)	compound	amt. 1)	viscosity ²⁾	appearance
9	a-1	12							X	gelling
10	a-1	12	b-6	3					X	gelling
11	a-1	15	b-6	5	CaCl ₂	0.2			X	gelling
12	a-1	15	b-6	5	CaCl ₂	0.5			380	good
13	a-1	15	b-7	5	CaCl ₂	0.2	c-1 ³⁾	1	X	gelling
14	a-3	15	b-7	5	CaCl ₂	0.2	c-1 ³⁾	1	X	gelling
15	a-5	12	b-7	3	CaCl ₂	0.2	c-1 ³⁾	1	480	good
16	a-5	15	b-7	8	CaCl ₂	0.2			X	gelling
40	a-1	15	b-1	1	CaCl ₂	0.2			280	good
41	a-1	15	b-1	3					420	good
42	a-1	15	b-1	5	CaCl ₂	0.2	c-2 ⁴⁾	5	170	good
43	a-1	15	b-1	3	CaCl ₂	0.1	c-1 ³⁾	1	260	good
44	a-1	15	b-1	3	CaCl ₂	0.2			170	good
45	a-1	15	b-1	3	NaCl	0.2			180	good
46	a-1	15	b-2	3					260	good
47	a-1	15	b-2	3	CaCl ₂	0.2			180	good
48	a-1	15	b-3	3	CaCl ₂	0.1			260	good
49	a-1	15	b-4	3					340	good
50	a-1	15	b-5	3	CaCl ₂	0.2			130	good

N.B. b-6 and b-7 are outside the scope of the claims.

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(continued)

No.	Composition of the softener				Initial state and stability			
	component (a) compound 1)	component (b-II) compound 1)	other component(1) amt. 1)	other component(1) amt. 1)	initial properties 20 days	initial properties -10°C	initial properties room temp.	stability after 20 days
51	a-2 15	b-1 3			380	good	good	good
52	a-2 15	b-2 3			440	good	good	good
53	a-2 15	b-2 3	NaCl 0.2		140	good	good	good
54	a-3 15	b-1 3	CaCl ₂ 0.2		170	good	good	good
55	a-3 15	b-1 3	CaCl ₂ 0.1		160	good	good	good
56	a-3 15	b-2 3			240	good	good	good
57	a-3 15	b-3 3			230	good	good	good
58	a-4 15	b-1 3	CaCl ₂ 0.1		160	good	good	good
59	a-5 15	b-1 3			190	good	good	good
60	a-5 15	b-1 3	CaCl ₂ 0.2		140	good	good	good
61	a-6 15	b-1 3			230	good	good	good
62	a-6 15	b-1 3	CaCl ₂ 0.2		150	good	good	good
63	a-7 15	b-1 3			380	good	good	good
64	a-8 15	b-1 3	CaCl ₂ 0.2		170	good	good	good

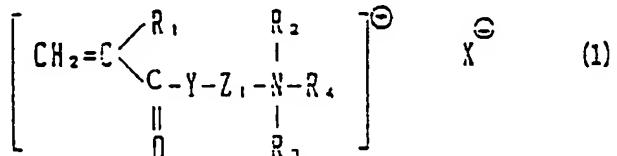
55 Claims

1. A cloth-softening liquid composition which comprises 7 to 30 wt.% of (a) a quaternary ammonium and 0.2 to 10 wt.% of (b-I) a polyether or a derivative thereof or (b-II) a polymer or copolymer of a cationic

surfactant monomer(s) and the balance of water,

said polyether (b-I) having a molecular weight of 5,000 to 200,000 being either an ethylene oxide or an ethylene oxide and propylene oxide adduct to a compound having at least five active hydrogen atoms, the oxyethylene units comprising at least 80% by weight of the total molecular weight of polyether units,

said cationic surfactant monomer (b-II) being represented by the following formula (1):

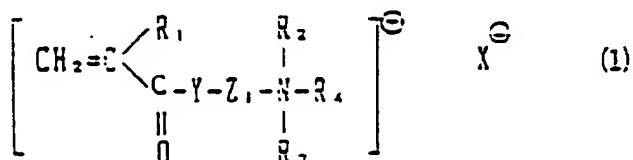


15 wherein R_1 stands for a hydrogen atom or a methyl group; R_2 stands for a straight-chain or branched alkyl or alkenyl group having 8 to 24 carbon atoms or a substituted, straight-chain or branched alkyl or alkenyl group having 8 to 24 carbon atoms; R_3 and R_4 each stands for a hydrogen atom or a lower alkyl; C_{2-4} hydroxyalkyl or polyoxyalkylene ($\bar{P} = 1$ to 3) group; Y stands for an oxygen atom or an -NH- group; Z_1 is a hydroxyalkylene group having 2 to 4 carbon atoms and X stands for a halogen atom or an acid residue.

Patentansprüche

25 1. Flüssige Weichmacherzusammensetzung für Stoffe, umfassend 7 bis 30 Gew.-% (a) eines quaternären Ammoniums und 0,2 bis 10 Gew.-% (b-I) eines Polyethers oder dessen Derivat oder (b-II) eines Polymers oder Copolymers eines kationischen oberflächenaktiven Monomers(en) und die Restmenge Wasser, wobei der Polyether (b-I) mit einem Molekulargewicht von 5.000 bis 200.000 entweder ein Ethylenoxid oder ein Ethylenoxid und ein Propylenoxidaddukt zu einer Verbindung mit wenigstens fünf aktiven Wasserstoffatomen ist, wobei die Oxyethyleneinheiten wenigstens 80 Gew.-% des gesamten Molekulargewichts der Polyethereinheiten umfassen, wobei das kationische Oberflächenmonomer (b-II) durch folgende Formel (1) dargestellt wird:

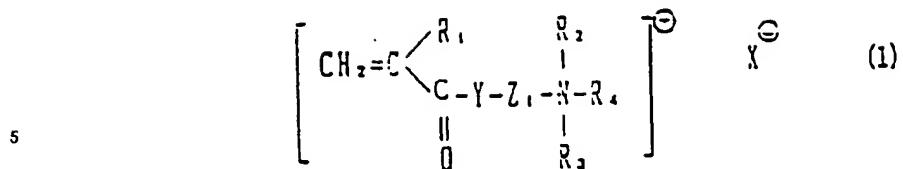
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40 wonin R_1 für ein Wasserstoffatom oder eine Methylgruppe steht; R_2 steht für eine geradkettige oder verzweigte Alkyl- oder Alkenylgruppe mit 8 oder 24 Kohlenstoffatomen oder eine substituierte, geradkettige oder verzweigte Alkyl- oder Alkenylgruppe mit 8 bis 24 Kohlenstoffatomen; R_3 und R_4 stehen jeweils für ein Wasserstoffatom oder ein niederes Alkyl; C_{2-4} -Hydroxyalkyl- oder Polyoxyalkylen($\bar{P}=1$ bis 3)gruppe; Y steht für ein Sauerstoffatom oder eine -NH-Gruppe; Z_1 ist eine Hydroxyalkylengruppe mit 2 bis 4 Kohlenstoffatomen und X steht für ein Halogenatom oder einen Säurerest.
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Reverendations

50 1. Composition liquide assouplissant le linge, qui comprend 7 à 30 % en poids de (a) un ammonium quaternaire et 0,2 à 10 % en poids de (b-I) un polyéther ou un dérivé de celui-ci ou (b-II) un polymère ou copolymère d'un ou plusieurs monomères tensio-actifs cationiques, le reste étant de l'eau,
 55 ledit polyéther (b-I) ayant un poids moléculaire de 5000 à 200 000 et étant un produit d'addition, soit d'oxyde d'éthylène, soit d'oxyde d'éthylène et d'oxyde de propylène, sur un composé ayant au moins cinq atomes d'hydrogène actifs, les motifs oxyéthylène constituant au moins 80 % en poids du poids moléculaire total des motifs de polyéther,
 ledit monomère tensio-actif cationique (b-II) étant représenté par la formule (1) suivante :



10 où R_1 représente un atome d'hydrogène ou un groupe méthyle ; R_2 représente un groupe alkyle ou alcényle à chaîne droite ou ramifiée ayant 8 à 24 atomes de carbone ou un groupe alkyle ou alcényle substitué à chaîne droite ou ramifiée ayant 8 à 24 atomes de carbone ; R_3 et R_4 représentent chacun un atome d'hydrogène ou un groupe alkyle inférieur, hydroxyalkyle en $\text{C}_2\text{-C}_4$ ou polyoxyalkylène ($\bar{P} = 1$ à 3) ; Y représente un atome d'oxygène ou un groupe $-\text{NH}-$; Z_1 est un groupe hydroxyalkylène ayant 2 à 4 atomes de carbone et X représente un atome d'halogène ou un résidu d'acide.

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